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Guy M. Danner

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/604,630  
Filing Date: August 06, 2003  
Appellant(s): DANNER ET AL.

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David J. Cole  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed August 25<sup>th</sup>, 2008 appealing from the Office action mailed October 25<sup>th</sup>, 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,312,304	Duthaler et al.	11-6-01
4,689,110	Leibowitz et al.	8-25-87
5,869,919	Sato et al.	2-9-99

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 2-3, 5-6, 11 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duthaler et al. (US 6,312,304) in view of Leibowitz et al. (US 4,689,110) and further in view of Sato et al. (US 5,869,919).

**With respect to claim 11**, Duthaler discloses, an electro-optic display comprising: a layer of reflective electro-optic material (18 in fig. 1) capable of changing its optical state on application of an electric field thereto (col. 3, lines 61-65);

an electrode arranged to apply an electric field to the layer of electro-optic material (24 in fig. 3);

a heat generating component in heat conducting relationship with the layer of electro-optic material (74 in fig. 6a/b), the heat generating component being disposed on the opposed side of the electrode from the layer of electro-optic material (clear from figs. 6a/b).

wherein a printed circuit board (70 in fig. 6a/b) is placed between the heat generating component and the electrode, the printed circuit board extending across the whole area of the layer of electro-optic material (clear from figs. 6a/b).

Duthaler does not explicitly disclose, a heat shield disposed between the heat generating component and the electrode, the heat shield comprising a layer of thermally conducting material.

Leibowitz discloses, creating a printed circuit board / heat shield with layers of thermally conducting material (copper, 20 in fig. 2); wherein conducting materials extend across the entire board (clear from fig. 2).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the circuit board of Duthaler (70 in fig. 6b) with the heat-shielded multi-layered circuit board of Leibowitz.

The motivation for doing so would have been to improve the coefficient of thermal expansion, thermal conductivity, and mechanical strength of the circuit board (Leibowitz; col. 3, lines 13-19).

Neither Leibowitz nor Duthaler expressly disclose that an air gap is present between the circuit board and the electrode of the display.

Sato discloses, a display device having an air gap (note the flowing arrows) between a circuit board (820 in fig. 8) and the electrodes of a display (201 in fig. 8).

Leibowitz, Duthaler and Sato are all analogous art because they are all from the same problem area namely circuit board manufacturing and packaging.

At the time of the invention it would have been obvious to one of ordinary skill in the art to include an air gap between the circuit board, of Leibowitz, and the display electrodes of Duthaler.

The motivation for doing so would have been to effectively cool the display as well as the drive circuits (Sato; col. 12, lines 38-42).

Therefore it would have been obvious to combine Leibowitz with Duthaler and subsequently Sato for the benefit of improved thermal conductivity, and effectively cooling the drive circuits to obtain the invention as specified in claim 11.

**With respect to claim 2**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Duthaler, when combined with Leibowitz and Sato, further discloses, wherein the heat shield comprises a printed circuit board (Leibowitz; figs. 1 and 2) having a conductive layer therein (Leibowitz; copper layers, 20 in fig. 2).

**With respect to claim 3**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Duthaler, when combined with Leibowitz and Sato, further discloses, wherein the heat shield comprises a plurality of layers of thermally insulating material (Leibowitz; 18 in fig. 2; PTFE) and a plurality of layers of thermally conducting material (Leibowitz; 20 in fig. 2; Copper), the layers of thermally insulating material alternating with the layers of thermally conducting material (Leibowitz; clear from fig. 2), and one layer of thermally conducting material (Leibowitz; note the outer layers of copper, 20 in fig. 2) being disposed between the layers of thermally insulating material and the layer of electro-optic material (upon combining the two Duthaler with Leibowitz and Sato this limitation would clearly be satisfied).

**With respect to claim 5**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Duthaler, when combined with Leibowitz and Sato, further discloses, wherein the heat shield comprises a polymeric film (Leibowitz; PTFE (polytetrafluoroethylene)) having a metal layer (Leibowitz; copper, 20 in fig. 2) formed thereon (Leibowitz; col. 3, lines 58-62).

**With respect to claim 6**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 5 (see above).

Duthaler, when combined with Leibowitz and Sato, further discloses, coating the polymeric layer with a conductive metal. While Leibowitz disclosing using copper (col. 4, lines 52-53), it would have been obvious to use aluminum instead as it is well known as a conductive metal.

The motivation for doing so would have been the decreased cost of aluminum over copper.

**With respect to claim 22**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Duthaler further discloses, wherein the electro-optic material comprises a rotating bichromal member material or an electrochromic material (col. 7, lines 8-45).

**With respect to claim 23**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 11 (see above).

Duthaler further discloses, wherein the electro-optic material comprises an electrophoretic material (col. 7, lines 8-9).

**With respect to claim 24**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 23 (see above).

Duthaler further discloses, wherein the electrophoretic material comprises at least one capsule having a capsule wall encapsulating a suspending fluid and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving there through on application of an electric field to the electrophoretic material (col. 7, lines 8-45).

**With respect to claim 25**, Duthaler, Leibowitz and Sato disclose, an electro-optic display according to claim 23 (see above).

Duthaler further discloses, wherein the electrophoretic material comprises a substrate having a plurality of closed cells formed therein, each of the cells having therein a suspending fluid and a plurality of electrically charged particles suspended in the suspending fluid and capable of moving there through on application of an electric field to the electrophoretic material (col. 7, lines 8-45; also note figures 6a-b).

#### **(10) Response to Argument**

On page 11 of the Brief, the Appellants concede that the replacement of the circuit board of Duthaler with the circuit board of Leibowitz would have been obvious to one of ordinary skill in art.

On pages 12-13 of the Brief, the Appellants argue that the combination of Duthaler and Leibowitz with Sato is not obvious. Specifically the Appellants argue that the purpose behind Sato's air gap is to ensure that the plasma display, itself, is cooled. The Appellants argue that Duthaler, and the claims, disclose an electro-optic display which does not, itself, generate large amounts of heat.



While the Examiner agrees that one purpose of the air gap and fan of Sato is to remove the heat generated by the plasma display this is not the only purpose. Sato expressly discloses that an additional advantage of the air gap and fan is effectively cooling the drive circuits (col. 12, lines 38-42). Duthaler expresses just such a need for cooling the drive circuits (col. 9, lines 51-61).

On page 14 of the Brief, the Appellants argue that the function of the air gap in the Appellants invention is completely different. Their air gap's purpose is to retard the flow of heat generated by the drive circuits into the display medium.

First the Examiner must again note that there is no discussion within the claim limitations which discuss the purpose, functionality or intended use of the Appellants air gap. Absent such limitations, the air gap functionality is given little patentable weight.

Furthermore, Sato's air gap is seen as retarding the flow of heat generated by the drive circuits into the display medium. Again the Appellants are directed to column 12, lines 38-42 which discloses that the drive circuits are effectively cooled. It should be clear that, as a result of this cooling, the flow of heat generated by the drive circuits will be retarded.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

#### **(12) Conclusion**

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

William Boddie

/William L Boddie/  
Examiner, Art Unit 2629

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Supervisory Patent Examiner, Art Unit 2629

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